

# Biomass Burning

## **Major Needs/Interests:**

Identification

Variation in composition

Variation in downwind composition -> Ozone

Long term transformation and effects in receptor regions (maturing)

Altitude of injection

Quantitative emission estimates

Large scale impact: requires large-scale models

## **People:**

Solene Turquety, Chieko Kittaka, Juying Warner, Alan Kwan,  
Stephanie Vay, David McCabe, John Hair, Alistair Lewis, Nicola Blake,  
Lenny Pfister, Gao Chen, Peter Colarco, Carolyn Butler, ...

# Characterization of biomass burning plumes

Alaska/Yukon, Arizona, Washington, British Columbia

## (1) Identification:

DC-8: UCI HCs, CN compounds, K, C<sub>2</sub>O<sub>4</sub>, absorption/scattering,  
DIAL aerosol size and depolarization, absence of industrial tracers  
--> coordinate with John Merrill's characterization)

Other platforms: J31, P3, BAe-146, Falcon

Ground: Wisconsin lidar, FTS CO, CO<sub>2</sub>, CH<sub>4</sub> (Wennberg),  
Maryland lidar, Huntsville lidar?

## (2) Composition of plumes (Identification-> noted variety).

Low-O<sub>3</sub> plumes, Low-CO<sub>2</sub> plumes (!)

Effects of cloud processing?

**Email list:** Gao Chen/Carolyn Butler will host an email list:

- (a) initial focus: identifying a list of major and "interesting" plumes by composition, both DC-8 in situ and remote (DIAL/MISR)
- (b) composition at sampling as a result of photochemical processing

# Quantitative Emission Estimates

Gabriele Pfister: Inverse Modeling MOPITT-MOZART

- GRL paper: Constraints on emissions for the Alaskan wildfires 2004 ...
- Daily emissions available to ICARTT

Solene Turquety: Bottom-up, Satellite constraint, Injection height sensitivity

- Paper: Using satellite observations to constrain the daily N. American ...
- Daily emissions available to ICARTT

S. Turquety/C. Kittaka) GEOS-Chem/RAQMS paper on injection heights, comparing variational and cloud top methods

Nature of fuel, nature of emissions as estimated from the ground

Non-INTEX groups (Turquety will be liason, Amber Soja (LaRC))

# Transport and Evolution of Plumes

Peter Collarco: Back and Forward Trajectory and RDF methods  
for plume origin and age  
Collaboration with RAQMS group on “pseudo-layering”

Photochemistry group/R.Hudman et al:  
ozone/non-ozone production in plume/ PAN decomposition ...?

Long-term transformations in character, recycling, effects of aerosol  
surfaces, effects of clouds, PAN, aerosol-processed species

NOAA studies - M. Trainer, et al.

- Low enhancement in P-3 study area: dilution or different chemistry for O<sub>3</sub> production
- Ozone production at plume edges and with plume mixing

# Impacts of biomass burning

C. Kittaka: Transport of aerosol and impacts on e.g., PM 2.5 and similar air quality indices (RAQMS)

G. Carmichael: Secondary organics from burning?

## **Links to Climate**

S. Vay: Correlates of CO<sub>2</sub>, variation, connection to interpretation remote sensing (OCO)

Aerosol-radiation impacts (P. Russell, Clarke)

(Various Authors, TBD) Broader Impact: What is CO effect of burning? O<sub>3</sub> effect of burning?

# Papers

Biomass burning in context of other papers:

- Clarke: Pollution and biomass burning aerosol over N. America
- Blake ?
- Browell ?
- Kahn ?